

SHOULDER GIRDLE

PATHOLOGY

1.) Hill-Sachs Defect

- Compression fracture of the articular surface of the posterolateral aspect of the humeral head

2.) Bankart Lesion

- Avulsion fx of anteroinferior aspect of glenoid rim

3.) Impingement Syndrome

- Impingement of the greater tuberosity & soft tissues on the coracoacromial ligamentous & osseous arch

4.) AC separation

- Partial or complete tear of the AC & coracoclavicular ligaments

5.) Idiopathic Chronic Adhesive Capsulitis

- Frozen shoulder
- Disability of the shoulder joints caused by chronic inflammation of the joint

6.) Shoulder Dislocation

- Traumatic removal of humeral head from the glenoid cavity

A.) SHOULDER

AP PROJECTION

External, Neutral, Internal Rotation

PP: Upright (more comfortable) or supine; patient slightly rotated; scapula // to IR

- **External Rotation:** hand supinated; humeral epicondyles // to IR; arm abducted slightly
- **Neutral Rotation:** palmar/anterior aspect of hand placed against the hip; humeral epicondyles 45° to IR
- **Internal Rotation:** dorsal/posterior aspect of hand against hip; humeral epicondyles ⊥ to IR

RP: 1 in. inferior to coracoid process

CR: ⊥

SS: Shoulder & proximal humerus

- **External Rotation:** greater tubercle & site of insertion of supraspinatus tendon
- **Neutral Rotation:** greater tubercle partially superimposing humeral head; posterior part of supraspinatus insertion
- **Internal Rotation:** lesser tubercle; site of the insertion of the subscapular tendon; proximal humerus in true lateral position

LAWRENCE METHOD

TRANSTHORACIC LATERAL PROJECTION

PP: Upright (more comfortable) or supine; patient in lateral position; uninjured arm raised; forearm rested on head; midcoronal plane ⊥ to IR; full inspiration (improves contrast & reduces exposure) or breathing technique (slow, deep breathing)

RP: Level of surgical neck

CR: Horizontal or 10-15° cephalad (cannot elevate unaffected shoulder)

SS: Proximal humerus

LAWRENCE METHOD

INFEROSUPERIOR AXIAL PROJECTION

PP: Supine; head, shoulder & elbow elevated (3 in.); arm abducted 90°; humerus rotated externally; IR placed against the neck; head turn away from side of interest

RP: Axilla

CR: Horizontal; 15-30° medially (greater abduction, greater angle)

SS:

- Proximal humerus
- Scapulohumeral joint
- Lateral portion of coracoids process
- Acromioclavicular (AC) articulation
- Insertion site of subscapular tendon
- Point of insertion of teres minor tendon

SHOULDER GIRDLE

RAFERT-LONG MODIFICATION

INFEROSUPERIOR AXIAL PROJECTION

PP: Supine; head, shoulder & elbow elevated (3 in.); arm abducted 90°; exaggerated external rotation of the arm; hand 45° to IR; thumb pointing downward; IR placed against the neck; head turn away from side of interest

RP: Axilla

CR: Horizontal; 15° medially\

SS: Coracoid process pointing anteriorly; lesser tubercle in profile

ER: Hill-Sachs compression fracture (defect)

WEST POINT METHOD

INFEROSUPERIOR AXIAL PROJECTION

PP: Prone; shoulder elevated (3 in.); head turn away from side of interest; arm abducted 90°; forearm rested over the edge of table; IR placed vertically

RP: 5 in. inferior & 1.5 in. medial to acromial edge

CR: 25° anteriorly & 25° medially

SS: Humeral head projected free of the coracoid process

ER:

- Used when chronic instability of shoulder is suspected
- To demonstrate Bankart's Lesion & associated Hills-Sachs defect

CLEMENTS MODIFICATION

INFEROSUPERIOR AXIAL PROJECTION

PP: Lateral recumbent; unaffected side against IR; affected arm abducted 90°; IR against superior aspect of shoulder

RP: Midaxillary region

CR: Horizontal or 5-15° medially (cannot abduct arm 90°)

SS: Acromioclavicular joint; scapulohumeral joint; glenohumeral joint

ER: When prone (Westpoint) or supine (Lawrence & Rafert-Long) position is not possible

SUPEROINFERIOR AXIAL PROJECTION

PP: Seated; patient lean laterally; elbow flexed 90° & rested on table; hand pronated; humeral epicondyles \perp to table

RP: Shoulder joint

CR: 5-15° toward the elbow

SS: Relationship of the proximal end of the humerus to the glenoid cavity

- AC articulation
- Outer portion of the coracoid process
- Points of insertion of the subscapularis muscle & teres minor muscle
- Coracoids process above clavicle
- Lesser tubercle in profile

AP AXIAL PROJECTION

PP: Upright/supine; scapulohumeral joint centered to IR

RP: Scapulohumeral joint

CR: 35° cephalad

SS: Relationship of the head of humerus to the glenoid cavity

- AC articulation
- Outer portion of the coracoid process
- Points of insertion of the subscapularis muscle & teres minor muscle
- Coracoids process above clavicle
- Lesser tubercle in profile

SCAPULAR Y

PA OBLIQUE PROJECTION

RUBIN-GRAY-GREEN

PP: Upright/recumbent; RAO/LAO; MCP 45-60° to IR; scapular flat surface \perp to IR; RPO/LPO (for severely injured patient)

RP: Scapulohumeral joint

CR: \perp

SHOULDER GIRDLE

SS: Scapular body (form the vertical component); acromion & coracoid processes (form the upper limbs)

- Superimposed humeral head & glenoid cavity
- Superimposed humeral shaft & scapular body
- Coracoid process superimposed or projected below the clavicle

ER: Useful in evaluation of suspected shoulder dislocations

- **Anterior/subcoracoid dislocation:** humeral head beneath the coracoid process
- **Posterior/subacromial dislocation:** humeral head beneath the acromion process

STRYKER “NOTCH” METHOD

AP AXIAL PROJECTION

HALL-ISAAC-BOOTH

PP: Supine; arm flexed slightly beyond 90°; palm of hand on top of head w/ fingertips resting on head (places humerus in a slight internal rotation); body of humerus // to MSP of body

RP: Coracoid process

CR: 10° cephalad

SS: Posterosuperior & posterolateral areas of humeral head

ER: Useful for demonstration of Hill-Sachs defect

B.) GLENOID CAVITY

GRASHEY METHOD

AP OBLIQUE PROJECTION

PP: Upright (more comfortable) or supine; RPO/LPO; body rotated 35-45° (upright)/>45° (supine) toward the affected side; scapula // to IR; arm slightly abducted; palm of hand on abdomen

RP: 2 in. medial & 2 in. inferior to superolateral border of shoulder

CR: ⊥

SS: Glenoid cavity (scapulohumeral joint)

APPLE METHOD

AP OBLIQUE PROJECTION

PP: Upright; RPO/LPO; body rotated 35-45° toward the affected side; scapula // to IR; patient hold 1 lb. weight; arm abducted 90°

RP: Level of coracoid process

CR: ⊥

SS: Glenoid cavity (scapulohumeral joint)

ER: To demonstrate a loss of articular cartilage in the scapulohumeral joint

GARTH METHOD

AP AXIAL OBLIQUE PROJECTION

PP: Supine/seated/upright; RPO/LPO; body rotated 45° toward the affected side; elbow flexed; arm placed across the chest

RP: Scapulohumeral joint

CR: 45° caudad

SS: Glenoid cavity (scapulohumeral joint)

- Humeral head
- Coracoid process
- Scapular head & neck

ER:

- For acute shoulder trauma
- For identifying posterior scapulohumeral dislocations
 - **Posterior dislocation:** humeral head projected superiorly from glenoid cavity
 - **Anterior dislocation:** humeral head projected inferiorly from glenoid cavity
- Glenoid fx
- Hill-Sachs lesions/defect
- Soft tissue calcification

SHOULDER GIRDLE

C.) SUPRASPINATUS

OUTLET/CORACOACROMIAL ARCH

NEER METHOD

TANGENTIAL PROJECTION

PP: Seated/upright; RPO/LPO; unaffected side rotated 45-60° away from IR; arm at side

RP: Superior aspect of humeral head

CR: 10-15° caudad

SS: Posterior surface of acromion & AC joint (superior border of coracoacromial outlet)

ER:

- Useful to demonstrate tangentially the coracoacromial arch/outlet
- To diagnose shoulder impingement

C.) INTERTUBERCULAR GROOVE

FISK MODIFICATION

TANGENTIAL PROJECTION

PP:

- **Supine:** chin extended; head rotated away from affected side; hand supinated; IR against superior surface of shoulder
- **Upright (fisk modification):** elbow flexed; posterior surface of forearm against table; patient grasps the IR; sandbag under hand; IR horizontal; patient lean forward; humerus 10-15° from vertical

RP: Intertubercular groove

CR: ⊥ (upright) or 10-15° posteriorly to long axis of humerus (supine)

SS: Intertubercular groove

D.) ACROMIOCLAVICULAR JOINTS

PEARSON METHOD

BILATERAL AP PROJECTION

PP: Upright/seated-upright; coracoid process centered to IR

RP: Coracoid process

CR: 15° cephalad

SS: AC joints above acromion

ER: For demonstration of suspected AC subluxation or dislocation

ALEXANDER METHOD

AP AXIAL PROJECTION

PP: Upright/seated-upright; arms hanging at sides (unsupported); 2 exposures: with & without weights (5-10 lbs.); affix the weights to patients wrist

RP: b/n level of AC joints

CR: ⊥

SS: Bilateral AC joints

ER: Used to demonstrate dislocation, separation & function of the joints

ALEXANDER METHOD

PA AXIAL PROJECTION

PP: Upright; RAO/LAO; MCP 45-60° from IR; scapula ⊥ to IR; lean affected shoulder against IR; arm pulled firmly across the chest (draws scapula laterally & forward & places joint close to IR)

RP: AC joints

CR: 15° caudad

SS: AC joint

- Relationship of the bones of the shoulder

E.) CLAVICLE

AP PROJECTION

PP: Supine/upright; arms along the sides; clavicle center to IR

RP: Midshaft of clavicle

CR: ⊥

SS: Frontal image of clavicle

PA Projection: reduces OID & improved image contrast

SHOULDER GIRDLE

AP AXIAL PROJECTION

Lordotic Position

PP:

- **Upright:** 1 foot in front; lean backward (lordotic); neck & shoulder against IR; neck in extreme flexion
- **Supine:** cannot assumed lordotic position
- Suspend at end of full inspiration

RP: Midshaft of clavicle

CR: 0-15° cephalad (upright); 15-30° (supine)

SS: Clavicle projected above the ribs; true/exact axial projection of clavicle

PA AXIAL PROJECTION

PP: Prone/standing

RP: Midshaft of clavicle

CR: 15-30° caudad

SS: Clavicle projected above the ribs; axial image of clavicle

TANGENTIAL PROJECTION

PP: Supine; arms along sides; shoulder depressed; head turn away from side of interest

RP: b/n clavicle & chest wall

CR: 25-40° from horizontal/cephalad

SS: Inferosuperior image of the clavicle

F.) SCAPULA

AP PROJECTION

PP: Supine/upright; arm abducted 90° w/ the body (draw scapula laterally); elbow flexed

RP: 2 in. inferior to coracoids process

CR: ⊥

SS: Scapula

- Lateral portion of scapula free of superimposition

LATERAL PROJECTION

PP: Upright/seated; RAO/LAO (more difficult to perform); 45-60° from IR; RPO/LPO (magnified scapula)

Arm Placement:

- Elbow flexed & arm on posterior chest
 - For demonstration of acromion & coracoid process
- Arm extended upward & forearm rested on head or across upper chest
 - For demonstration of scapular body

RP: Midmedial border of protruding scapula

CR: ⊥

SS: Lateral image of scapula

Mazujian Suggestion: arm across the upper chest (grasping opposite shoulder)

LORENZ-LILIENFELD METHODS

PA OBLIQUE

PP: Upright/lateral recumbent;

Lorenz Method: arm of affected side 90° to long axis of body; elbow flexed; hand rested against head

Lilienfeld Method: arm of affected side obliquely upward; head rested against head

RP: b/n chest wall & midarea of protruding scapula

CR: ⊥

SS: Oblique image of scapula

AP OBLIQUE

PP: Supine/upright; RPO/LPO; shoulder rotate 15-25° away from affected side or 25-35° (steeper oblique) arm extended superiorly; elbow flexed; hand supinated under head; arm of affected side across anterior chest

RP: Midscapular area

CR: ⊥ to lateral border of rib cage

SS: Oblique image of scapula free or nearly free of rib superimposition

SHOULDER GIRDLE

G.) CORACOID PROCESS

AP AXIAL PROJECTION

PP: Supine; arm of affected side slightly abducted; hand supinated

RP: Coracoid process

CR: 15-45° cephalad

SS: Coracoid process with minimal self-superimposition

Kwak-Espiniella-Kattan Recommendation: CR 30°

H.) SCAPULAR SPINE

LAQUERRIERE-PEIRQUIN METHOD

PP: Supine; scapular body // to IR; head turned away from side of interest

Funke: use of 15° radiolucent wedge for patient with small breast

- Prevent clavicular superimposition

RP: Scapular spine (posterosuperior region of shoulder)

CR: 45° caudad

SS: Scapular spine free of superimposition

LAQUERRIERE-PIERQUIN METHOD

PP:

- **Prone:** arms along sides; head rested on chin/cheek of affected side; hand supinated; scapular // to IR
- **Upright:** back rested against the end of table; IR placed 45° from table (wedge support)

RP: Scapular spine

CR: 45° cephalad (prone); 45° posteroinferiorly (upright)

SS: Scapular spine free of superimposition

☺ THE END ☺

“BOARD EXAM is a matter of PREPARATION. If you FAIL to prepare, you PREPARE to fail”

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